Remarks

The Applicant thanks the Examiner for withdrawing the rejections under 35 USC 101 and 35 USC 112, first paragraph.

The above amendment places claims 2, 5, 14, 23, and 37 have been placed into independent form, without making any other changes, and therefore do not introduce any new issues. The claims objected to were amended to capitalize the word "Effector" or "Meta," to obviate the objections, and do not introduce any new issues. Additionally, the word "partially" is deleted from the claims 14, 47, and 48 to obviate the rejection under 35 USC 112, second paragraph of those claims. Also, some claims have been amended to read better by inserting commas or words such as "of," which are not believed to change the scope of the claims. Additionally, claim dependencies of claims previously dependent on now cancelled claims 1 and 17 have been changed to depend from an appropriate independent claim still pending. Accordingly, no new issues have been introduced by the above amendment, and entry of the above amendment is respect fully requested.

Request to Withdraw the Finality of the Office Action

In the first Office Action, claims 5, 8, and 14 were rejected under 35 USC 112, second paragraph for referencing claim 1 in the middle of the claims, which was alleged to be an improper claim dependence. However, the Office Action has now introduced a new objection of claims 5, 8, and 14 under 37 CFR 1.75(c) for the same reason. This new objection was equally applicable to original claims 5, 8, and 14 at the time of the

first Office Action, and consequently, the objection was not necessitated by amendment. After final the Applicant is severely limited in the manner in which the claims can be amended, and introducing the objection to the claims at this point does not allow the Applicant to amend the claims in response to the objection in the manner that the Applicant may desire. Consequently, the Applicant respectfully submits that the finality of the Office Action is improper, and request removal of the finality of the Office Action.

Objection to the Claims

Claims 1, 8, 11, 13, 14, 16, 17, 26, 27, 36-38, 40, 48, 49, and 52-55 were objected to for not capitalizing the word Effector and/or the word Meta. Accordingly, those words have been capitalized, which obviates this ground of rejection. Additionally, claim 36 was objected to for having a period in the middle of the claim and not at the end of the claim, which has also been corrected, thereby obviating this ground of objection.

The Office Action objected to claims 5, 8, and 14 under 37 CFR 1.75(c) as being in improper independent form. In the prior Office Action the Applicant cited sections of MPEP 2173.05(f), which clearly explains that these claim formats are acceptable under 35 USC 112, second paragraph. Usually the MPEP is pretty good about suggesting alternative grounds of rejection or objection when the issue is a problem, but different grounds should be chosen. The Applicant respectfully submits that the MPEP's lack of a suggestion to object to claims of this format under 37 CFR 1.75(c) and the Courts lack a suggestion that claims of this format should be rejected under the "further limit" clause of

35 USC 112, fourth paragraph suggests that the objection under 37 CFR 1.75(c) or a rejection on any other grounds is improper. Nonetheless, claims 5 and 14 are being amended to be in independent form to obviate this objection. The Applicant would be willing to also consider amending claim 8, if the Examiner will allow the amendment.

35 USC 112, second paragraph

Independent Claims 2, 14, 23, 37, and 60-62

The Office Action stated,

> Claim 1 recites: " ... adjusts how the Effectors behave ... adjusts how information is transmitted
>
> Examiner does not understand what this limitation means or is intended to cover. It is not clear what behaviors the Effectors can be adjusted between. It is not clear from what set of transmission methods the Effector information transmittal is chosen.

The Office Action made similar comments regarding claims 17 and 60-62. Although claims 1 and 17 are being cancelled, claims 2, 14, 23, and 37 have been placed into independent form including the text of claims 1 and 17. In general, in ordinary usage, the word behavior refers to the manner in which object in question responds to a given initial situation or stimulus. An initial situation is a form of an input and a response is a form of an output. Thus any behavior may be characterized as a set of outputs and inputs that are associated with one another. Similarly, the specification states,

> A second method, called implicit programming, designs the architecture and programs of an Effector machine based on how you want the machine to **behave** [(emphasis added)]. A method for implicit programming is presented in the next section.
>
> In both explicit programming and implicit programming, the use of an Input Interpreter and Output Interpreter greatly simplify the programming task. In any programming endeavor, the task that needs to be solved, performed or finished can be represented mathematically by an *(input, output)* set of pairs, $((I_1, O_1), (I_2, O_2), \ldots)$. In some cases, the set, $((I_1, O_1), (I_2, O_2), \ldots (I_n, O_n))$, is

> finite. In other cases, it can be infinite. For each i, I_i is the input point, and O_i is the corresponding output point. The *(input, output)* set specifies the behavior of the Effector machine that we wish to design.

The usage of the word behavior in the above section implies that the word behavior refers to the input-outputs pair that are associated with an element or machine. Consequently, the Applicant respectfully submits that one of ordinary skill in the art would understand the word "behavior" of original claim 1 to mean the manner in which the computing element responds to a given situation or the set of outputs produced by a set of inputs.

The specification states, "An Effector machine consists of computing elements called effectors," which implies that computational elements are generalizations of the Effectors of the specification. Reciting that the Effector is adjusted, implies that the Effector is adjustable, which implies that the Effector has parameters that can be adjusted. One would expect that any adjustable (e.g., programmable) computing element would have adjustable parameters. One example of a set of adjustable parameters that may be associated with a computing element is given in the specification as the thresholds and refractory periods. The values of these parameters may be adjusted. Regarding "how information is transmitted," some of the parameters of the computational elements may be associated with the transmission of information, such as transmission times, pulse width, and pulse amplitude, which control how information is transmitted.

Although claims 2, 14, 23, 37, and 60-62 do not specify how the behavior is adjusted, the Applicant respectfully submits that not claiming how the behavior is adjusted makes the claim generic to any method of adjusting the behavior, which makes this clause of the claims broad (but not indefinite). In other words, not specifying "how"

only makes the claim generic to any "how," but does not create any ambiguity as to the scope of the claim. MPEP 2173.04 states,

> **Breadth Is Not Indefiniteness**
> Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

Claims 16, and 32, and 40-43

Regarding claim 16, the Office Action stated

> Claim 16 recites the limitation "software machine" in line 3. There is insufficient antecedent basis for this limitation in the claim.

The Office Action makes a similar comment regarding claim 32. Similarly, the Office Action also states,

> Claim 40 recites the limitation "software module" in line 2. There is insufficient antecedent basis for this limitation in the claim.
> Claim 41 recites the limitation "software Effectors" in line 3. There is insufficient antecedent basis for this limitation in the claim.
> Claim 42 recites the limitation "software Effectors" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.
> Claim 43 recites the limitation "software Effectors" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 16 and 32 recite,

> evolving the graph includes at least changing one or more of the following properties associated with at least a portion of a representation of the machine: *a number of software modules per software machine* (emphasis added)....

Similarly, claim 40 recites "said evolving of the graph includes at least changing a number of software Effectors per software module." Claim 41 recites, "said evolving of the graph includes at least changing one or more refractory periods associated with one or more software Effectors." Claim 42 recites, "said evolving of the graph includes at least changing one or more thresholds associated with one or more software Effectors

associated with the graph." Claim 43 recites, "said evolving of the graph includes at least changing a number of software connections between two or more software Effectors."

However, the phrases "software machine," "software module," and "software Effectors" in the above passages of claims 16, 32, and 40-43 are not preceded by the article "the" or "said." There is no indication in the phrase, "a number of software modules per software machine," that there should have been an earlier mention of the phrase "software machine" and consequently there is no issue of antecedence regarding claims 16 and 32. Similarly, there is no indication in the phrase "changing a number of software Effectors per software module" that there should have been an earlier mention of the phrase "software module" and consequently there is no issue of antecedence regarding claim 40. There is no indication in the phrase "changing one or more refractory periods associated with one or more software Effectors" that there should have been an earlier mention of the phrase "software Effectors" and consequently there is no issue of antecedence regarding claim 41. There is no indication in the phrase "changing one or more thresholds associated with one or more software Effectors" that there should have been an earlier mention of the phrase "software Effectors" and consequently there is no issue of antecedence regarding claim 42. There is no indication in the phrase "changing a number of software connections between two or more software Effectors" that there should have been an earlier mention of the phrase "software Effectors" and consequently that Applicant respectfully submits that there is no issue of antecedence regarding claim 43.

Even were there an antecedence issue, an antecedence issue is not necessarily a reason for rejecting a claim under 35 USC 112, second paragraph (see MPEP 2173.05(e), for example). The meaning of the phrase "*adjusting ... a number of software modules per software machine*" is that there may be one or more software machines and each software machine has a number of modules and the number of module in each software machine may change during the evolution process. Consequently, the Applicant respectfully submits that the metes and bounds of claims 16 and 32 are clear regardless of whether there is an antecedence issue, and therefore the rejection under 35 USC 112, second paragraph, is improper. Similar comments are equally applicable regarding claims 40-43. Nonetheless, the Applicant would be happy to amend claims 16, 32, and 40-43 to resolve this issue, if the Examiner is willing to enter the amendment. Alternatively, the Applicant is open to suggestions from the Examiner of other ways to resolve this issue.

Claim 28

> Regarding claims 28, the Office Action stated,
>
> Claim 28 recites: "... based on an error tolerance."
> It is unclear what kind of "error" the tolerance limits.

Claim 28 recites,

> designing said machine architecture to limit values to which one or more parameters are allowed to be set, based on an error tolerance.

The Applicant respectfully submits that the term "error tolerance" is a term of art widely used throughout the engineering and scientific communities. As an example of the

subject matter covered by claim 28 and as an explanation of the term "error tolerance," the specification states,

> Let r denote the refractory period of an effector. Let t_{detect} denote the time at which effector E_i detects some other effector fired. Let t_{actual} denote the actual time that this other effector fired. To make the analysis simpler to present, we ignore the transmission time from the effector that fired to the effector that received this firing information. Let ε_i denote the maximum possible value for $|t_{detect} - t_{actual}|$. Define $\varepsilon = \max\{\varepsilon_i : E_i \textit{ is an effector in machine } \mathfrak{M}\}$. If $\varepsilon = 0$, then all effectors detect when another effector has fired with perfect precision. Let T denote a finite interval of time such that the hardware obeys $0 < \varepsilon < r < T$. Refer to the diagram, titled *Error Tolerance in Effectors*.
>
> Define χ: NxN $\rightarrow$ N as $\chi(L, n) = L * (L\text{-}2) * (L\text{-}4) \ldots (L\text{-}2n\text{+}2) = \prod_{k=1}^{n} (L\text{-}2k\text{+}2)$:
> As an example, $\chi(7, 3) = 7*5*3$. As another example, $\chi(20, 5) = 20 * 18 * 16 * 14 * 12$. Choose T so that r divides T with zero remainder.
> The formula:
>
> $$\sum_{n=1}^{\frac{T}{r}} \frac{\chi(\frac{T}{r}, n)(\frac{r}{\varepsilon})^n}{n!}$$
>
> is the maximum number of possible distinct firing configurations for an effector, during the interval of time T. This number of firing configurations determines the number of different states that the effector could be in during this time period.

In other words, the error tolerance ε is the maximum difference between a measured or detected value and the actual value. A number r is chosen that is larger than the error tolerance. The interval for a variable is chosen to be an integer multiple of the number r.

In the example of the specification, the interval T is based on the error tolerance ε, because the error tolerance ε is a lower limit for the number r. Although the claim is not limited to the example of the specification, the metes and bounds of the claim are clear. If the error tolerance for a parameter is necessary for computing the range of values that the parameter may assume, then the method for computing the maximum value for the parameter is based on the error tolerance.

Claims 47 and 48

The Office Action stated, "Examiner disagrees for claims 14, 47, and 48. The word partially has not been deleted." The Applicant apologizes for the oversight. The word partially has now been deleted.

Alternatively , the phrase "designing a machine, at least partially by evolving a graph" has the same meaning as "designing a machine, comprising evolving a graph," because since the word "comprising" is open ended, the evolving of the graph only has to be one step in the designing. The phrase "designing a machine, comprising evolving a graph," is generic to there being any number of additional steps to the "designing," and consequently the evolving only needs to design part of the machine. Similarly, the phrase "designing a machine, at least partially by evolving a graph" means that the evolving only needs to design part of the machine. Neither phrase specifies how much of the design or which part of the designing is performed by the evolving. However, that lack of specificity is breadth not indefiniteness. Consequently, since both phrases have the same metes and bounds, and since the clarity of the phrase "designing a machine, at least partially by evolving a graph" is at least as clear as "designing a machine, comprising evolving a graph," and since there is no issue under 35 USC 112, second paragraph, regarding "designing a machine, comprising evolving a graph," the Applicant respectfully submits that there is also is no issue under 35 USC 112, second paragraph, regarding the phrase "at least partially" or the phrase "designing a machine, at least partially by evolving a graph."

35 USC 112, second paragraph

Regarding claim 8, the Office Action states, "It is unclear whether the output interpreter is part of the machine of claim 1 or if the output interpreter is external to the machine of claim 1." Regarding claim 14, the Office Action states, "It is unclear if it is necessary to actually possess the machine of claim 1 in order to use the method of claim 14. It appears that the method of claim 14 merely performs abstract graph manipulation and does not necessitate actually possessing the machine of claim 1." Also, regarding claims 8, 14, 47, and 48, the Office Action states, "It is unclear if the claimed system is the same as the machine of claim 1 or if the claimed system is not the same as the machine of claim 1.

However, MPEP 2173.05(f) states,

> A claim which makes reference to a preceding claim to define a limitation is an acceptable claim construction which should not necessarily be rejected as improper or confusing under 35 U.S.C. 112, second paragraph. For example, claims which read: "The product produced by the method of claim 1." or "A method of producing ethanol comprising contacting amylose with the culture of claim 1 under the following conditions ....." are not indefinite under 35 U.S.C. 112, second paragraph, merely because of the reference to another claim. See also *Ex parte Porter*, 25 USPQ2d 1144 (Bd. Pat. App. & Inter. 1992) where reference to "the nozzle of claim 7" in a method claim was held to comply with 35 U.S.C. 112, second paragraph.

In other words, according to MPEP 2173.05(f) it does not matter where in the claim a reference to a prior claim occurs. It also does not matter if the reference to the prior claim is for the method used or the item made by another method. Either way, the claim conforms to 35 USC 112, second paragraph. The Office Action has not given any reason why the current claim should be an exception, and the Applicant is not aware of anything in the present claim that would make claim 8 an exception to MPEP 2173.05(f). Specifically, contrary to the implications of the Office Action, the phrase "A system comprising... the machine of claim 1..." conforms with 35 USC 112, second paragraph,

no differently than the phrase, "A system comprising... a machine...." Similarly, "A system comprising... an interpreter for designing the machine of claim 1..." conforms to 35 USC 112, second paragraph, no differently than "A system comprising... an interpreter for designing a machine...." When a system comprises a machine of claim 1, the machine of claim 1 is a component of the system. There is no confusion about whether the claim requires the possession of the system of claim 1 if the system is the machine (contrary to the implications of the Office Action). Similarly, when a system comprises an interpreter that designs the machine of claim 1, there is no confusion about whether one has to be in possession of the machine of claim 1 just as there is no confusion about whether one needs to have possession of the nozzle of claim 7 in order to implement a method that makes the nozzle of claim 7 of *Ex parte Porter*. Significantly, the courts have not seen fit to reject claims of this format under the "further limit" clause of 35 USC 112, second paragraph. Therefore, the Applicant respectfully submits that the above ground of rejection is improper, and should be withdrawn.

35 USC 102

> While discussing 35 USC 102, the Office Action stated,
>
> Is the same "Effector" discussed in the claim and specification? Is the current definition claimed fully supported by the original disclosure as filed?

However, these questions are not pertinent to 35 USC 102. Additionally, the originally filed specification contained claims reciting, "computing elements, called Effectors," implying that an Effector is at least a computing element. The specification lists many other possible properties that may be included in an Effector, implying that an Effector may be a computing element that includes any of the other properties listed.

The Office Action rejected claims 1, 2, 5, 6, 8, 10-12, 14-18, 21, 23, 24, 26-28, 31, 32, 34, 35, 37, 38, 43, 45, and 47-62 are rejected under 35 25 U.S.C. 102(b) as being anticipated by de Garis et al.

Claims 1 and 17 are cancelled by this amendment, and are therefore no longer an issue. The content of cancelled claim 1 is now incorporated into now independent claims 2, 5, and 14. Similarly, the content of cancelled claim 17 is now incorporated into now independent claims 23 and 37.

Independent Claim 2 and claims 11, 27, 37, 38, 47, 48, 49, and 51-58

Regarding claim 2, the Office Action states,

> **de Garis** anticipates:
> wherein a subset of said Effectors are configured to receive information from a Static program (p35-67 especially "spiketrains (bit strings of Os and 1s) to be input" §1 or "input is converted automatically to a spiketrain, which enters the neural net module" §3.1 or "instantiated" §5.2.1 or "preprogrammed" §5.3 or "would not modify themselves based on their runtime experience" §8.2 or "an initiating input arrives" §8.2;

However, the spiketrain is an input signal and not an input program. An input signal is just a signal that is fed into a device as input, whereas an input program is a set of instructions that are fed to a machine as input. In contrast to the input signal of de Garis et al., among other things, an input program may have input of its own (or more precisely, the input program may cause the Effector machine to read or receive input data or an input signal), which may be varied each time the input program is run. Although de Garis et al. uses programmable FPGAs, and programs the FPGAs to form modules of neural networks, the neural networks formed by de Garis et al. can only be evolved to

form new networks, but between each evolution are not programmable. De Garis et al.'s neural networks cannot receive a program.

de Garis et al. states (at page 45, section 5.1),

> A critical part of the CBM approach is that the detailed dendritic/axonal tree structure of the neural modules is not "manually designed" or "engineered" to perform a specific brain function, but rather evolved directly in hardware, using genetic algorithms, in the spirit of the growing research field of evolvable hardware [8].

De Garis also asserts (at page 58),

> Evolved circuits can at times achieve performance levels beyond what human engineers can achieve with traditional top-down design techniques, i.e., attain superior engineering performance levels

In other words, the whole point of de Garis et al. is to automatically determine parameters of the CBM modules that simulate specific brain functions, and not to leave some parameters that can be selected by a human being whom may not be capable of doing as good as a job. De Gars et al. implies any one of ordinary skill would have associated the act of programming with a human being sending instructions to a machine for the machine to carry out. Consequently, one of ordinary skill would have been lead away from producing programmable CBM module (that can thereby be manually designed or engineered by manually designing or engineering a program to perform different tasks).

Each of claims 11, 27, 37, 38, 47, 48, 49, and 51-58 recite a program that is read by or run by the claimed Effector machine. The comments above regarding claim 2 (1) about de Garis et al. using only nonprogrammable CBM modules and (2) about having teachings that would have lead one away from programming CBM modules (vulnerable to the human programming errors) to perform brain functions instead of automatically evolving (without being subject to the limits of human programming capabilities) a

nonprogrammable CBM module to perform the brain function are equally applicable to claims 11, 27, 37, 38, 47, 48, 49, and 51-58. Consequently, the Applicant respectfully submits that claims 11, 27, 37, 38, 47, 48, 49, and 51-58 are not disclosed by de Garis et al.

Independent Claim 5

Regarding claim 5, the Office Action states,

> *The phrase "for designing at least the machine of claim* 1" *is interpreted to be an intended use, and therefore does not further limit the claim).*

However, even if, arguendo, the phrase "for designing at least the machine of claim 1" is a statement of intended use, MPEP 2111.02(II) states,

> During examination, statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the recited purpose or intended use results in a structural difference (or, in the case of process claims, manipulative difference) between the claimed invention and the prior art. If so, the recitation serves to limit the claim. See, e.g., *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963)....

In other words, contrary to the Office Action's assertion, a statement of intended use further limits a claim if the "intended use results in a structural difference (or, in the case of process claims, manipulative difference)." Since claim 5 recites, "one or more instructions that constitute an input interpreter for designing at least the machine of claim 1," the one or more instructions that constitute an input interpreter need to contain instructions that are at least capable of designing the input interpreter of claim 1. However, the Applicant respectfully submits that the Office Action has not shown anything in de Garis et al. that indicates that the input interpreter is capable of designing anything let alone the Effector machine of claim 1.

Claims 5 and 21

The text of claim 5 was cited above. Similarly, claim 21 recites, "designing the Effector machine via an input interpreter."

Regarding claims 5 and 21, de Garis et al. states (at the bottom of page 41),

> The convolution algorithm takes the output spiketrain (a bit string of 0s and 1s), and runs the pulses (the 1s) by the convolution function shown in the simplified example below.

De Garis also states (at pages 42 and 43),

> Section 3 above explained the use of the SIIC representation, that provides an efficient transformation of a spiketrain (string of bits) into a (clocked) time varying "analog" signal. We need this interpretation in order to interpret the spiketrain output from the CoDi modules to evaluate their fitness values (by comparing the actual converted analog output waveforms with user specified target waveforms). However, we also need the inverse process, namely, an algorithm that takes as input, a clocked (digitized, binary numbered) time-varying "analog" signal, and outputs a spiketrain. This conversion is needed as an interface between the motors/sensors of the robot bodies (e.g., a kitten robot) that the artificial brain controls, and the brain's CoDi modules.

In other words, the convolution algorithm is de Garis et al.'s input interpreter, and the deconvolution algorithm is De Garis et al.'s output interpreter. However, de Garis et al.'s input and output interpreters only convert one signal format to another signal format (one of the formats being a series of ones and zeros that are used outside of the modules of de Garis et al., and the other of formats being a convolution of the 1's and 0's that is used by the module). Thus, the input and output interpreters of de Garis et al. do not, and are not capable of, designing anything. Consequently, the Applicant respectfully submits that the input and output interpreters of de Garis et al. do not, and are not capable of, designing the machine of claim 1, because they only convert signals from one format to another. Similarly, de Garis et al. does not disclose, "the input interpreter outputs a software

Effector machine, which is a design for the hardware Effector machine," as recited in claim 5.

Regarding claim 21, the Office Action stated,

> de Garis anticipates:
> designing the Effector machine via an input interpreter (p35-67 especially "CBM" §5.1 or "module interconnection netlist" §5.2.5).

However, de Garis et al. states (at page 51),

> In order to support the run mode of operation, which requires a large number of evolved modules to function as one artificial brain, a module interconnection memory is provided. Each module can receive inputs from up to 188 other modules. A list of these source modules referenced to each module is stored in a CBM cross-reference memory (3 Mbytes) by the host computer. This list is compiled by CBM software using a module interconnection netlist in EDIF format. This netlist reflects the module interconnections ***as designed by the user***, using off-the-shelf schematic capture tools (emphasis added).

In other words the netlist "designed by the user" and is not designed by the input interpreter of CBM modules. The input and output interpreters do not create the netlist. Further, the netlist includes how to connect the modules, but not how to make the neural networks within the modules. Thus, the Applicant respectfully submits that contrary to the implications of the Office Action the storing of the netlist is not "designing the Effector machine via an input interpreter."

Independent Claim 5 and claims 8, 11, 16, 18, 24, 27, 38, and 47-58

In regard each of the above claims, the Office Action alleges that various statements are just an intended use and then gives the alleged intended use no weight. Apparently, the Office Action takes the position that anything following the word "for" in a claim is an intended use. However, the word "for" is generally used to introduce a further definition and/or modification of the structure that proceeds the word "for." The

most common example of such a construction is a means plus function claim. The current claims are different than means plus function claims in that a structural element is recited instead of the just a nonstructural generic word such as the word "means." The means plus function format was not established by statute or rules, but by traditional styles of claim drafting, which in turn is based on ordinary English grammar. Although the current claims are not means plus function claims, the style of these claims format is similar, and therefore the manner of interpreting the literal meaning of the text is similar, (based on the similar grammatical style). Consequently, the Applicant respectfully submits that the phrase after the word "for" further limits the structural details of the structure just prior to the word "for."

Additionally, even if, arguendo, everything after the word for is just an intended use, the Applicant respectfully submits that the intended use cannot be just summarily dismissed, without any further analysis or explanation. The element having the intended use is modified by the statement of intended use so that the element is capable of having the intended use. If the element recited is already inherently capable of the intended use then the statement of intended use adds nothing.

For example, regarding claim 5, the Office Action stated that the phrase "for designing at least the machine of claim 1" is interpreted to be an intended use, and therefore does not further limit the claim. Claim 5 recites "an input interpreter for designing at least...." Ordinarily, the prior art interpreters are not capable of designing anything (the Applicant is not aware of any prior art interpreters that capable of designing anything). In order for the interpreter to be capable of designing the items listed in the claim, the interpreter must have a certain structure. In the non-limiting example in the

specification, the input interpreter is an Effector machine, and is therefore capable of designing the items listed in the claim.

As another example, regarding claim 8, the Office Action stated

> The phrase "wherein the interpreter is for translating firing activity of a subset of Effectors into a desired output form" is interpreted to be an intended use, and therefore does not further limit the claim.

Claim 8 recites, "wherein the interpreter is for translating firing activity of a subset of said Effectors into a desired output form." Similar to claim 5, although interpreters generally interpret one set of data and convert it to another set of data, not every interpreter can interpret firing activity of the Effectors claimed, and consequently, the interpreting of the firing activities limits the claim to including features that interpret the firing activity.

As another example, regarding claims 11 and 27, the Office Action states,

> The claim is interpreted to be directed to an intended use, and therefore does not further limit the parent claim

However, claims 11 and 27 recite,

> the machine including at least a portion for receiving the meta program and for converting the meta program into input for that machine.

The phrase "the machine including at least..." is a recitation of structure included in the machine and is therefore not an intended use. The antecedence for the "meta program" in the above line is in the earlier part of the claim, after the phrase, "the machine is for running a meta program...." Consequently, the meta program is defined by this earlier part of the claim. The "machine" that is prior to the word "for" did not necessarily run the meta program that is recited after the word "for." Consequently, the part of the claim that follows the word "for" limits the claim by requiring it to run the meta program.

Consequently, the Applicant respectfully submits that none of the "for" clauses or alleged intended uses of claims 11 and 27 can be ignored.

As another example, claim 16 recites, "the evolving of the graph is for changing the following properties...." The evolving of a graph would not necessarily include evolving the items listed in the rest of the claim. Evolving those items requires structure (e.g., lines of code) not previously recited in the claim, and consequently, the Applicant respectfully submits that claim 16 requires the structure for evolving the items listed in the claim.

As another example, claim 60 recites,

> A machine readable medium storing instructions for configuring one or more digital computers to run a software machine, the software machine comprising:....

The Office Action stated,

> de Garis anticipates:
> a machine readable medium storing instructions (p36-67 especially "large RAM memory space" §1 or "module interconnection memory" §2 or "memory" §5.2.2 or §5.2.5; The remainder of the claim is interpreted to be directed to an intended use, and therefore does not further limit the claim, though the limitations are mapped to the art in rejections found above.

In other words the Office Action alleges that everything beyond the first 6 words (which is everything after the word "for") is just an intended use and does not need to be considered. The word "comprising" is a transitional phrase that separates that preamble of claim 60, from its body. Thus, the Office Action alleges that the body of the claim is just an intended use. In contrast, the standard for determining whether the preamble carries weight is to determine whether the preamble breathes life and meaning into the claim. Whether or not the preamble carries weight, the rest of the claim (i.e., the body of the claim) is presumed to not be rendered an intended use based on the preamble, and

similarly, the body of the current claim is not an intended use. In contrast to the implications of the Office Action, the weight of the preamble is determined by whether the preamble breathes life and meaning into the rest of the claim. Paragraph "c" of the claim 60 relies on the preamble for antecedence of the term "software machine." Additionally, the preamble states that the software machine defined by the body of the claim is stored on a computer readable medium, and consequently, the Applicant respectfully submits that the preamble of claim 60 has weight as well as (of course) the body of the claim following the well recognized transitional word "comprising" (see MPEP 2111.02 regarding the weight of the preamble and MPEP 2111.03 regarding transitional phrases).

Similar to claim 60 of the current application, Claim 1 of *In re David Buszard*, CAFC docket # 2006-1342 (Decided September 27, 2007) read,

> A counterfeit detection system **for** identifying a counterfeit object from a set of similar authentic objects, ...(emphasis added).

Had the CAFC interpreted the claims in the manner that the Office Action proposes there would have been no case, because according to the Office Action everything after the first four words of the claim should have been an intended use and according to the Office Action everything following the word "for" should therefore not have been given any weight. In contrast, the CAFC gave weight to every word in claim 1 despite the use of the word "for."

Nonetheless, although the Applicant disagrees with the Office Action's position regarding the interpretation of the claims, the Applicant would be happy to amend the claims to obviate this issue, such as by deleting the word "for" (e.g., and substitute the word "that" where appropriate), if the Examiner is of the opinion that such amendments

will obviate this issue, and if the amendment will be entered. The Applicant would also consider other suggestions about how to amend the claims to obviate this issue.

Claim 6

Regarding claim 6, the Office Action stated,

> *The person of ordinary skill in the art at the time the invention was made would have logically understood that the CBM software could be the second Effector machine which implements the input interpreter)*

The Office Action does not deny that de Garis has no disclosure of using an Effector machine for the input and output interpreter. Even if one of ordinary skill would have understood that the input or output interpreter could have been the second Effector machine, that only implies that were someone to ask one of ordinary skill whether the input or output interpreter could be an Effector machine, he or she would have said yes, but that does not mean that one or ordinary skill would have thought or been motivated to make the input and output interpreter from an Effector machine. In other words, the Office Action's assertion is equivalent to a statement that one of ordinary skill had the skill to make the interpreters from an Effector machine, but the fact that the invention is within the skill of one of ordinary skill is not a motivation to modify de Garis et al. (cf. MPEP 2143.01 (IV), is entitled, "FACT THAT THE CLAIMED INVENTION IS WITHIN THE CAPABILITIES OF ONE OF ORDINARY SKILL IN THE ART IS NOT SUFFICIENT BY ITSELF TO ESTABLISH *PRIMA FACIE* OBVIOUSNESS").

Further, the interpreters of de Garis et al. convert signals from a format that is used by an external system to one used by the CBM module (which is apparently what the Office Action alleges is the claimed Effector machine), but if each CBM needs a

signal converter to communicate with external modules, logically one of ordinary skill would conclude that a CBM cannot be used as an input or output interpreter, because then the interpreter would need an interpreter, which would make the CBM interpreter pointless, and consequently the Applicant respectfully submits that making the interpreter from an effector machine was not obvious to one of ordinary skill at the time of the invention, and is certainly not disclosed by De Garis et al.

Claims 10, 26, and 54-58

> Regarding claims 10 and 26, the Office Action stated
>
> said machine is a dynamic machine in that one or more parameters of the Effectors are functions of time (p36-67 especially time-dependent signals" §1 or "time-dependent signal" §3.1 or "time-shifted spiketrain" §3.2).

However, the only time dependence disclosed in De Garis et al. is in the input and output signals (even a plain copper wire will display a time dependent output signal if the input signal is time dependent even though copper wire do not have time dependent parameters). As an example, in the current specification, the triplet $(A_{ki}(s), \omega_{ki}(s), \tau_{ki}(s))$, which are the amplitudes $A_{ki}(s)$ associated with connections ki, the pulse width $\omega_{ki}(s)$ associated with connections ki, and the transmission time $\tau_{ki}(s)$ between connections ki are disclosed to be functions of time. A dynamic program may alter the values of the pulse amplitude, pulse width and transmission times between two effectors at each time the associated effectors (k and i) are involved in an event (or more frequently or less frequently). The transmission time τ_{ki} is an explicit parameter that may be adjusted by any given line of a program that the Effector machine runs. Also, in the meta program of the specification the time at which a quintuple or a statement is executed, the time is

explicitly specified so that the time at which the other parameters of the quintuple are applied to the specified Effectors are explicitly specified by the meta program. In contrast, the neurons and dendrites that result from a particular evolution do not have parameters that change with time. The neurons and dendrites of De Garis et al. merely output time dependent signals only if the input signal is also time dependent. Although claims 10 and 26 are not limited to having the particular time dependent parameters discussed above, claim 10 recites, "said machine is a dynamic machine in that one or more parameters of the Effectors are functions of time" and claim 26 recites, "parameters of the Effectors are functions of time," which the Applicant respectfully submits is not in anyway suggested, taught, or disclosed by De Garis et al..

Claims 54-58 depend from claim 26 and also recites that the Effectors have time as a parameter, and consequently, claim 58 should be allowable for the same reasons as claims 10 and 26.

Claims 11, 27, and 54-58

Claim 11 recites

> the machine is for running a Meta program that changes, over time, one or more properties associated with one or more of said Effectors, the meta program being a sequence of sets, each set being a list of values of parameters of Effectors, and each list of values having the parameters, the machine including at least a portion for receiving the meta program and for converting the meta program into input for that machine.

Claim 27 includes similar recitations. In other words, claims 11 and 27 recite "the machine including at least a portion for receiving the meta program and for converting the meta program into input for that machine," which is clearly a recitation of a structural feature of the machine, and not a statement of intended use. Claims 11 and 27 further

defines the meta program that it runs by stating, "the meta program being a sequence of sets, each set being a list of values of parameters of Effectors, and each list of values having the parameters," which requires the portion of the machine for receiving the meta program to have a structure that is capable of receiving lists of parameters of Effectors. Additionally, claims 11 and 27 require the machine to be "for running a Meta program that changes, over time, one or more properties associated with one or more of said Effectors...." In other words, the Meta program is also required to cause one or more properties associated the Effectors to change over time, and the machine is required to run such a Meta program. The Applicant respectfully submits that in order to change the parameters of the neurons and dendrites of De Garis et al., another evolution must be performed in which the manner in which the parameters of the neurons and dendrites change is presumably essentially random and not explicitly specified in parameters of lines of code. Even if arguendo the running of the Meta program is an intended use, the machine must have a structure that is capable of running the meta program, and the Applicant respectfully submits that the machines of De Garis et al. are incapable of running the meta programs of claims 11 and 27.

Claims 54-58 also recite a Meta program, and consequently, claims 54-58 should be allowable for similar reasons as claims 11 and 27. Additionally, claim 54 requires the threshold to be a function of time (or more precisely claim 54 recites "a Meta program that changes, over time, a threshold"), claim 55 requires the refractory period to be a function of time (or more precisely claim 55 recites "a Meta program that changes, over time, a refractory period"), claim 56 requires the pulse amplitude to be a function of time (or more precisely claim 56 recites "a Meta program that changes, over time, a pulse

amplitude"), claim 57 requires the pulse width to be a function of time (or more precisely claim 57 recites "a Meta program that changes, over time, a pulse width"), claim 58 requires the transmission time to be a function of time (or more precisely claim 58 recites "a Meta program that changes, over time, a transmission time"), which the Applicant respectfully submits are not disclosed taught or suggested by De Garis et al..

Claims 12 and 28

> Regarding claim 12, the Office Action stated,
>
> > de Garis anticipates: wherein said machine architecture comprises hardware having a predetermined error tolerance by limiting a range of values to which one or more parameters of the hardware are allowed to be set (p35-67 especially "preprogrammed to shut off the main clock when a temperature limit is exceeded" §5.3).

However, the temperature is not a parameter that is set. The more operations are performed on the FPGA the hotter the circuit becomes. If enough operations are performed fast enough, the FPGA could over heat if the circuit is not shut off, and the passage referred to by the Office Action briefly mentions this safety feature for preventing over heating. In contrast, claim 12 recites,

> > hardware having a predetermined error tolerance by limiting a range of values to which one or more parameters of the hardware are allowed to be ***set*** (emphasis added).

Similarly, claim 28, recites,

> > designing said machine architecture to limit values to which one or more parameters are allowed to be set, based on an error tolerance.

For example, the error tolerance may place a limit on the amplitude of the pulse width that a dynamic program sets for a signal transmitted between a given pair of Effectors. In general, De Garis et al. do not even discuss setting parameters. The Applicant

respectfully submits there is no disclosure in De Garis et al. of the user being limited as to how high or how low a particular parameters may be set.

Claim 14 and independent claim 23,

The Office Action stated regarding claim 14,

> de Garis anticipates:
> designing the machine of claim 1, at least partially, by evolving a graph representing the machine to produce a design of the Effector machine (p36-67 especially §5.1 or §7.3).

However, De Garis et al. states (at page 45),

> GAs [Genetic Algorithms] operate on a population of chromosomes, which represent neural networks of different topologies and functionalities. Better performers for a particular function are selected and further reproduced using chromosome recombination and mutation. After hundreds of generations, this approach produces very complex neural networks with a desired functionality. The evolutionary approach can create a complex functionality without any a priori knowledge about how to achieve it, as long as the desired input/output function is known.

De Garis et al. states (at page 45),

> In the genetic phase, the function of the cells is to create an offspring chromosome from two parent chromosomes using crossover and mutation masks.

Similarly, De Garis et al. states (in the paragraph bridging pages 50 and 51),

> *5.2.4. Genetic algorithm unit*
>
> To evolve a module, a population of modules is evaluated by computing every module's fitness measure, as described above. A subset of the best modules is then selected for further reproduction. In each generation of modules, the best are mated and mutated to produce a set of offspring modules to become the next generation. Mating and mutation is performed by the CBM hardware core at high speed, configured for the genetic phase. During this phase, each cell's firmware implements uniform crossover and mutation masks, two parent registers and an offspring register. Thus, each offspring chromosome is generated in nanoseconds, directly in hardware. Crossover is performed in parallel in hardware by all of a module's 14K CA cells. One crossover act takes about 100 ns for two parent chromosomes, each of which is 91 kbit long, using a 91 kbit crossover mask and a

> 91 kbit mutation mask. The selection algorithm is performed by the host computer in software, using access to the CBM via a PCI interface.

Thus, chromosomes differ from graphs, because chromosomes are growth instructions for the neurons (but not for the entire machine) that dictate how neurons grow (but not how the entire machine grows). In contrast to De Garis et al., claim 14 recites, "evolving a graph representing the machine to produce a design of the machine...." In other words, the Applicant respectfully submits that the graph of claim 14 represents the entire machine not just some of the neurons.

Further, De Garis et al. states at page 37,

> Each module evaluation consists of growing a new set of axonic and dendritic trees guided by the module's chromosome (that provides the growth instructions for the trees).

Similarly, De Garis et al. states at page 38,

> The chromosome guides the local direction of the dendritic and axonic tree growth.

In other words, the chromosomes determine how the neurons grow (via their dendrites and axons) and the chromosomes "provide growth instructions." There may be rules to determine how the neurons interact while growing during the growth phase (Atsumi gives some examples of such rules). The combination of the rules and the chromosomes determine the final configuration that is actually used as a CBM module. The chromosomes are a description of how to grow neurons and not a description of the actual configuration of the neurons. In contrast, a graph, as recited in claims 14 and 23, is a description of an actual configuration of the Effectors and not a description of how to grow the Effectors, and consequently the Applicant respectfully submits that the graphs of claim 14 and 23 are not disclosed by De Garis et al.

In independent claim 23, the evolving is performed to design the machine architecture, which implies that the machine architecture does not include the evolving. Claim 23 recites,

> a machine architecture that, while the machine is running,
> adjusts how Effectors behave, and
> adjusts how information is transmitted from one Effector to another Effector

In contrast, De Garis et al. states,

> The CBM may make practical the creation of artificial brains, that are defined to be assemblages of tens of thousands (and higher magnitudes) of evolved neural net modules into specific ***architectures***.

In other words, only changes the architecture of their neural network via an evolution process. After any given architecture is changed by the evolution by De Garis et al., the resulting architecture does not change how neurons behave or transmit messages. In contrast to De Garis et al., the Applicant respectfully submits that claim 23 adjusts how Effectors behave and how information is transmitted.

Claims 16 and 32

Regarding claim 16, the Office Action states,

> de Garis anticipates:
> wherein the evolving of the graph (p36-67 as detailed above for claim 14; *The claim is interpreted to be directed to an intended use, and therefore does not further limit the parent claim).*

The Office Action does not explain the reason for considering claim 16 an intended use. Even if arguendo claim 16 were an intended use, the method of claim 16 would still need to include features that allow the claim 16 to evolve the items recited in claim 16.

Claims 16 and 32 recite,

> the evolving of the graph is for changing the following properties:

a number of software modules per software machine,
a number of software Effectors per software module,
one or more refractory periods associated with one or more software Effectors,
one or more thresholds associated with one or more software Effectors,
a number of software connections,
one or more amplitudes associated with two or more software Effectors,
one or more pulse widths associated with two or more software Effectors, ...

The Office Action stated,

de Garis anticipates:
wherein evolving the graph includes at least changing one or more of the following properties associated with at least a portion of a representation of the machine:
- a number of software modules per software machine,
- a number of software effectors per software modules,
- a refractory period associated with at least one of the software Effectors,
- a threshold associated with a software Effector,
- a number of software connections between the software Effectors (p36-67 especially §5.1),
- an amplitude associated with one or more of the software Effectors,
- a pulse width associated with one or more of the software Effectors (p36-67 especially §6), and
- a conduction time between at least two of the software Effectors.

Although De Garis et al. may discuss evolving their machine, De Garis et al. evolve chromosomes, and chromosomes represent the parameters of the modules of neurons. De Garis et al. does not specify what parameters of any individual neuron may change (if any) during an evolution. De Garis et al. always refers to evolving "the modules," but it is not clear what parameters of the modules are allowed to vary during an evolution. Possibly, all of De Garis et al. et al.'s neurons have the same pulse amplitude, threshold, and/or pulse width, and just which neurons are connected to one another changes. Possibly, the number of neurons in each module is always kept the same. The Applicant respectfully submits that De Garis et al. do not even discuss refractory times, and clearly do not disclose varying the refractory time during an evolution.

Claim 35 and independent claims 37, 59, 61, and 62

Regarding claims 35, 37, 59, 61, and 62, the Office Action alleged that various features were a design choice, without and any explanation of why these items were considered a design choice. The word "design" in the phrase "design choice" is similar to the word "design" in the phrase "design patent." A design choice refers to a difference that is only aesthetic in nature, serves no other purpose, and is suggested by the aesthetics, such as a rearrangement of parts that would not have been expected to affect the function in anyway (see MPEP 2144.04 VI(c), which gives an example in which an arrangement of parts was considered a design choice). However, there are no such rearrangements of parts that are claimed. The allegation that a feature is a design choice is an admission that there is a difference between the claim and the reference. If there is a difference between the claimed subject matter and the reference, then the Applicant respectfully submits that the reference does not anticipate the claim, and the rejection under 35 USC 102 should be withdrawn.

Claim 37 recites,

> a subset of said Effectors are configured to receive information from a Meta program, the Meta program being a sequence of sets, each set being a list of values of parameters of Effectors

Regarding claim 37, the Office Action stated,

> The phrase "configured to receive information from a Meta program ... " is interpreted to be merely a design choice

However, being able to receive information from a meta program allows the machine to be programmed manually, which is contrary to the implications of De Garis et al.

Regarding claim 59, the Office Action stated,

> The phrase "being configured such that the interpreter interprets whether an Effector fires as binary information, and interprets the binary information into the desired output form, which includes at least a sequence of symbols" is interpreted to be merely a design choice

However, outputting symbols (instead of an analog signal), allows a human user to read the output and allows the machine to perform functions related to tasks such as word processing. In contrast, the Applicant respectfully submits that De Garis et al. specifically require an analog signal output so that each module of their brain can be more easily "engineered," and consequently outputting symbols is not a design choice.

Regarding claims 61 and 62, the Applicant respectfully submits that configuring each Effector of the collection to be communicatively coupled to at least one other Effector is necessary for the Effectors to communicate with one another and is not just a design choice.

Additionally regarding claims 61 and 62, the Office Action states, the phrase

> "configuring a portion of the hardware computing machine for receiving input that sets values for one or more parameters of individual Effectors from the collections of Effectors, the one or more parameters including a time at which information is transmitted from the individual Effectors to another of the individual Effectors" is interpreted to be merely a design choice

However, "configuring a portion of the hardware computing machine for receiving input that sets values for one or more parameters of individual Effectors from the collections of Effectors, the one or more parameters including a time at which information is transmitted from the individual Effectors to another" allows the programmer to specify the time of firing of an Effector, which creates a flexibility in programming the Effector machine that a neural network does not share. In contrast, in De Garis et al., after a particular module or machine is arrived at by De Garis et al. et al.'s evolution process, the machine or module can only be either used as is or replaced by another machine or

module following the same evolution process, and is not programmed. Consequently, the Applicant respectfully submits that De Garis et al. do not allow "configuring a portion of the hardware computing machine for receiving input that sets values for one or more parameters of individual Effectors from the collections of Effectors, *the one or more parameters including a time at which information is transmitted from the individual Effectors to another*, (emphasis added)" which therefore cannot be a design choice.

Claims 47 and 48

Claim 47 recites,

> an input interpreter for designing at least a Static program for the Effector machine.

Similarly, claim 48 recites,

> an input interpreter for designing at least a Meta program for the Effector machine, the Meta program being a sequence of sets, each set being a list of values of parameters of Effectors.

The Office Action has not shown, and De Garis et al. does not disclose, teach, or suggest an input interpreter that designs a static program or a Meta program (or event that designs a part of a static program (as recited in claim 47) or a Meta program (as recited in claim 48). The Applicant respectfully submits that De Garis et al. certainly do not prescribe the format of the meta program designed and therefore also does not disclose that the meta program designed should be "a sequence of sets, each set being a list of values of parameters of Effectors," as recited in claim 48.

Claim 58 and Independent Claims 61 and 62

Among other things, claim 58 recites,

the dynamic machine is for running a Meta program that changes, over time, a transmission time associated with two or more Effectors, *the Meta program being a sequence of sets, each set being a list of values of parameters of Effectors* (emphasis).

Also, among other things claim 61 recites,

configuring a portion of the hardware computing machine for receiving input that sets values for one or more parameters of individual Effectors from the collections of Effectors, the one or more parameters including a time at which information is transmitted from the individual Effectors to another of the individual Effectors.

Similarly claim 62 recites,

the hardware computing machine including a portion for receiving input that sets values for one or more parameters of individual Effectors from the collections of Effectors, the one or more parameters including a time at which information is transmitted from of the individual Effectors to another of the individual Effectors.

The Applicant respectfully submits that De Garis et al. does not disclose computing elements having (1) time as a parameter or (2) receiving input that "sets values for one or more parameters," as recited in claims 58, 61, and 62.

Independent Claim 60

Claim 60 recites

the software machine receives input instructions in a language native to the software machine and outputs instructions in a language native to the digital computer.

As an example, the input to the machine of claim 60 could be a series of quintuplets , which are understood by the software Effector machine as a Meta program. The meta program is converted to a series of 1s and 0s, which are understood by the digital machine. In contrast, the Applicant respectfully submits that although De Garis et al. also converts the input into a series of 1s and 0s, the input to De Garis et al. et al.'s CBM

modules are analog signals, which are not native to either of the CBM modules or any digital machine on which De Garis et al. et al.'s CBM modules are running. De Garis et al. states (in the paragraph bridging pages 36 and 37),

> The SITC (spiketrain to analog signal conversion) and the HSA (analog signal to spiketrain conversion) allow users to think entirely in analog terms when specifying input signals and desired target output signals. This is much easier than thinking in terms of spike intervals (the number of Os between the Is). This analog thinking simplifies the evolution of modules, and overcomes the limitation to some extent of the I-bit binary signaling of the CoDi modules (and hence the CBM).

In other words, it is important De Garis et al. to use analog signals as input (instead of a language native to the FPGA), because they are more intuitive to the engineer and therefore facilitate designing the CBM modules. Additionally, De Garis et al. reconfigure FPGA to obtain different hardware CBM modules, but do not disclose a software version of their CBM modules. Consequently, the Applicant respectfully submits that the conversion of "input instructions in a language native to the software machine and outputs instructions in a language native to the digital computer" (as recited in claim 60) is not disclosed.

35 USC 103

> The Office Action stated,
>
> **Atsumi** teaches: at least changing one or more representations of conduction time associated with representations of the Effectors (p188-197 especially p191 C21f1-2).

The Applicant disagrees. Although Atsumi, mentions conduction delay Δ_{ij}^{ax} (right column page 191, which was cited by the Office Action), even assuming that the conduction delay is the claimed conduction time, Atsumi never mentions changing the conduction

delay as part of evolving the neural network. Atsumi evolves the genome (see the paragraph bridging pages 188 and 189) instead of evolving a graph. In addition to the evolving a graph not being the same as evolving a chromosome, FIG. 2 (on page 190), is entitled "Outline of the genotype," and lists properties of the genotype of the genome associated with Gene(i,j). However, the delay time is not listed, and therefore the applicant respectfully submits that contrary to the assertions of the Office Action, Atsumi does not disclose that "the evolving of the graph includes at least changing one or more representations of conduction times associated with representations of the Effectors," as recited in claim 46.

Claims 41, 42, and 44

Claims 41, 42, and 44 were rejected under 35 USC 103 as unpatentable over De Garis et al. in view of Marian.

Claims 41, 42, and 44 depend from claim 14 and are therefore allowable for at least the same reasons that claim 14 is allowable.

Additionally, regarding claim 41, the Office Action states,

> **Marian** teaches:
>
> at least changing one or more refractory periods associated with one or more software Effectors (p 1-181especially §4.3.1 or §4.3.3 or Algorithm 1 or Algorithm 3 or Table 5.3).

The refractory period of Marian has two portions. The first portion is "absolute refractory period" (defined in the last paragraph of page 84) during which no signals can be sent and during the second portion it is more difficult to send signal than other times, but it is still possible to send signals However, the current specification explains in mathematical terms (at page 4, third paragraph),

> The input effector can fire at any time as long as this time minus the time the input effector last fired is greater than or equal to the input effector's refractory period.

The specification also defines the refractory period (at page 4, fourth paragraph) as

> The refractory period, r_i, is the amount of time that must elapse after effector *Ei* just fired before E_i can fire again.

The Applicant is entitled to be his own lexicographer, which is the intent here as seen from the fact that the term refractory period is not defined in the claim, but is defined in the specification. In contrast to the implications of the statements of the Office Action, the claimed refractory period corresponds to Marian's "absolute refractory period," which "lasts 1 ms" (as explained in the last paragraph of page 84), always, and is therefore not a function of time. The Applicant respectfully submits that it follows that the claimed, "changing one or more refractory periods associated with one or more software Effectors" is not disclosed by Marian.

Further, regarding claim 44, the Office Action stated,

> **Marian** teaches:
>
> > at least changing one or more representation of amplitudes associated with one or more representations of Effectors associated with the graph (p1-181 especially §2.1.2 or §7.2.1).

However, section 2.12 discusses "Motor planning in special coordinates" (the title of the section), and never mentions altering the amplitudes of the neurons. Section 7.2.1 discusses similar subject matter. The Applicant respectfully submits that it follows that, "changing one or more representation of amplitudes associated with one or more representations of Effectors associated with the graph," as recited in claim 44 is not disclosed by Marian.

Dependent Claims

Regarding the dependent claims (including any of the dependent claims not explicitly discussed above), each of independent claims 2, 5, 23, 37, and 60-62 were shown to be allowable. Each of the remaining claims depends directly or indirectly from one of claims 2, 5, 23, 37, and 60-67 are allowable for at leas the same reasons. Additionally, it was shown that many of the dependent claims include features that are separately patentable, and the claims that depend from these dependent claims are also allowable for at leas the same reason. For example, claims 9 and 25 were rejected under 35 USC 103 as unpatentable over De Garis et al. in view of Sieglemann and Azam. Claims 13 and 29 were rejected under 35 USC 103 as unpatentable over De Garis et al. in view of Mead. Claims 36, 39, and 40 were rejected under 35 USC 103 as unpatentable over De Garis et al. in view of Azam. Claims 9, 13, 25, 29, 36, 39, and 40 are allowable for at least the same reasons as the claims from which they depend, which includes one of independent claims 2, 5, 23, 37, and 60-62.

Conclusion

Therefore, for the above reasons, the Applicant respectfully submits that the present application is condition for allowance, and the Applicant respectfully requests that this application be allowed.

Please charge any fees that may be due (and that have not been paid for elsewhere) to Deposit Account # 503345.

An extension of time to the current date is hereby requested, if an extension of time is necessary. The fee for the extension of time may be billed to the above account

number, if (1) there is not a check enclosed that already covers the extension of time, or (2) if a check was enclosed, but is insufficient to cover all of the fees due.

Please feel free to contact the Applicant's undersigned representative at 408-993-1800.

Respectfully Submitted,

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Oct 22, 2007
Date

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